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Eighty-two presents were announced as having been received since the last meeting, including, amongst others :—

Greenwich Observations, 1890, presented by the Observatory; Annals of the Cape Observatory, vol. i. part 2, presented by the Observatory; H. Jacoby, the parallaxes of μ and θ *Cassiopeiæ*, deduced from the Rutherfurd photographic measures, presented by the author ; Potsdam Astrophysical Observatory, Publications, vol. viii. ; Lick Observatory, original negatives of *Jupiter*, and enlargements of photographs of *Jupiter*, &c., presented by the Observatory; Lick Observatory photograph of *Jupiter*, enlargement made and presented by A. Stanley Williams, Esq. ; Lick Observatory photographs of the Moon, series of enlargements made and presented by Baron Albert Rothschild ; series of photographs made by Dr. Warren De la Rue during the total solar eclipse of 1860 July 18, and a photograph of Dr. De la Rue, presented by Thomas De la Rue, Esq. ; a 10-inch brass pillar sextant by Troughton, and a double sextant by Cary, bequeathed by the late A. E. Nevins, Esq.

Note on the Determination of the Moon's Mass. By E. J. Stone, M.A., F.R.S., Radcliffe Observer.

In *Gould's Astronomical Journal*, No. 289, Professor G. W. Hill has given a determination of the Moon's mass from the values of the constants of Precession and Nutation which are at present generally accepted.

In this paper the approximations are pushed to the seventh order of small quantities, and although, from the fact that Delaunay's expressions of parallax are only pushed to the fifth order of small quantities, no reliance can be placed on the absolute accuracy of the terms of the sixth and seventh orders, the result is probably the most accurate which has yet been obtained.

But Professor Hill in this paper expresses an opinion that in previous investigations the undisturbed elliptic co-ordinates of the Moon had alone been employed. This is certainly not the case in the investigation, the results of which are given in the *Monthly Notices R.A.S.*, vol. xxviii. p. 42. In this investigation I used Delaunay's co-ordinates, and my results should be identical with Professor Hill's to the order of approximation to which I proceeded, which was the third. On examination I find such to be the case, although the agreement is slightly disguised by the introduction of two different constants ϵ and ϵ', which have to be found from observations by a comparison between the theoretical results and the constants of precession and nutation.

To make the comparison easy between my results and those

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which I had obtained from Serret's formulæ, *Monthly Notices*, vol. xxviii. p. 25, I introduced the constant

$$\epsilon = \frac{\text{Moon's mass}}{\text{Sun's mass}} \cdot \frac{(\text{mean distance of Sun})^3}{(\text{mean distance of Moon})^3}.$$

The exact meaning of the expressions "mean distances of the Sun and Moon" being defined by the conditions that if a' and D′ denote these distances, a the equatorial radius of the Earth, and π and C the constants of solar and lunar parallax

$$\sin 1'' . \pi = \frac{\mathrm{a}}{a'}; \ \sin 1'' . \mathrm{C} = \frac{\mathrm{a}}{\mathrm{D}}.$$

But Professor Hill has practically introduced a constant

$$\epsilon' = \frac{\text{Moon's mass}}{\text{Sun's mass}} \cdot \frac{a_1^3}{a^3},$$

where a is the constant introduced in Delaunay's Theory as satisfying the condition

$$\text{Moon's mass} = n^2 a^3,$$

where n is the Moon's mean motion in longitude; but we have in *Delaunay's Lunar Theory*, vol. ii. p. 914,

$$\sin 1'' . \mathrm{C} = \frac{\mathrm{a}}{a}\left(1 + \frac{m^2}{6} + \frac{m^2 e_1^{\ 2}}{4} - \frac{179}{288} m^4 - \frac{97}{48} m^5\right) = \frac{a}{\mathrm{D}}$$

$$\therefore \frac{a}{\mathrm{D}} = \left(1 + \frac{m^2}{6} + \frac{m^2 e_1^{\ 2}}{4} - \frac{179}{288} m^4 - \frac{97}{48} m^5\right)$$

But

$$\frac{\epsilon}{\epsilon_1} = \frac{a^3}{\mathrm{D}^3} = \left(1 + \frac{m^2}{6} + \&\mathrm{c.}\right)^3$$

or

$$\epsilon = \epsilon^1\left(1 + \frac{m^2}{6} + \&\mathrm{c.}\right)^3 = \epsilon^1\left(1 + \frac{m^2}{2} + \&\mathrm{c.}\right)$$

If we substitute this value of ϵ in the equations

$$\text{Luni-solar precession} = \kappa\left(1 + \frac{3e_1^{\ 2}}{2}\right) + \kappa\epsilon\left(1 + \frac{3e^2}{2} - 6\gamma^2\right)$$

$$\text{Nutation} = \kappa\epsilon\frac{2\gamma}{\mu}\left[1 + \frac{3e^2}{2} - \frac{5\gamma^2}{2}\right]$$

given in my paper, we have to the third order of small quantities

$$\text{Luni-solar precession} = \kappa\left[1 + \frac{3e_1^{\ 2}}{2}\right] + \kappa\epsilon'\left[1 + \frac{m^2}{2} + \frac{3e^2}{2} - 6\gamma^2\right]$$

$$\text{Nutation} = \kappa\epsilon'\frac{2\gamma}{\mu}\left[1 + \frac{m^2}{2} + \frac{3e^2}{2} - \frac{5\gamma^2}{2}\right],$$

expressions which are identical to the same order of approximation with those given by Professor Hill.

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On the Distribution of Temperature in the Transit-circle Room at the Royal Observatory, Greenwich. By H. H. Turner, M.A., B.Sc.

It has been mentioned in recent Reports of the Council (*Monthly Notices*, vol. xlix. p. 175, vol. l. p. 185, vol. li. p. 208) that experiments were in progress on the distribution of temperature in the transit-circle room at the Royal Observatory, Greenwich. A few observations of this kind were made in 1879 May and June, but the investigation was not carried further when it was found that there was no serious anomaly in the gradual diminution of temperature outwards from the instrument. But for several reasons it has seemed advisable to inquire more closely into the matter.

Six thermometers in all were read as nearly simultaneously as practicable, two or three times in the course of the evening, by the transit-circle observer. Three of them are in general use for computing refraction: viz. the interior thermometer (I) placed near the instrument, the exterior thermometer (E), near the north wall of the room, and the Front Court thermometer (F) mounted on a post with a revolving shade to protect it from the Sun, 53 feet from the exterior north wall of the transit-circle room. The other three thermometers were placed in the shutter opening along the horizontal roof of the transit-circle room—one (N) at the north corner, another (M) in the middle, and the third (S) at the south corner. It was soon found that there was a systematic difference between the readings of (N) and (S); that is to say, the distribution of temperature was not symmetrical in the north and south direction. To eliminate any effect of residual index error on this difference the thermometers (N) and (S) were in 1890 January interchanged. At the same time the thermometer (M) was removed from its central position and placed further to the south, directly over the thermometer (I), but still in the shutter opening. In these new positions the thermometers are designated (*n*), (*m*), and (*s*). The following table gives all requisite information as to the identity and position of the six thermometers:—

TABLE I.

Distinguishing Letter.	Number.	Index Correction.	Distance from Centre of Transit Circle.		
			North.	East.	Above.
		°	ft.	ft.	ft.
I	12264	−0·5	− 7·3	+ 2·4	− 0·6
E	45357	−0·2	+23	+ 2·6	+ 1·0
F	44520	−0 3	+71	−36	− 0·5
N	A2637	−0·2	+17·5	+ 0·5	+13
M	A2645	−0·2	0 0	− 0·5	+13
S	A2640	−0 2	−17·5	+ 0·5	+13
n	A2640	−0·2	+17·5	+ 0·5	+13
m	A2645	−0·2	− 7·3	− 0·5	+13
s	A2637	−0·2	−17 5	+ 0·5	+13